

*Note on the Variable 97. 1910 Cygni.*

By Arthur R. Hinks, M.A.

This star appeared on three plates taken with the Sheepshanks Equatorial of the Cambridge Observatory on three days in 1909 August, and was missing on three plates of the same region taken 1910 August. A brief announcement, with a diagram of the field, appeared in *A.N.*, 4448.

The place of the star, referred to the four stars 8796, 8805, 8815, and 8828 of the Lund A.G. catalogue, was

R.A.  $19^{\text{h}} 49^{\text{m}} 55^{\text{s}}.01$  Decl.  $+36^{\circ} 46' 57''.4$  1900.0,

and its provisional magnitude for 1909 August 10 was  $10^{\text{m}}.5$ , deduced by photographic extrapolation from Lund magnitudes. The star is in the field of Kapteyn Selected Areas, Special List, No. 8, and this led to its detection.

Visual search for the star was made with the Sheepshanks Telescope (aperture 12-inch) on 1910 September 20, September 27, and November 21, but without result. On the latter night it must have been below  $13\frac{1}{2}^{\text{m}}$ .

In January I received a letter from Professor Barnard, dated 1911 January 3, sending me a diagram and measures of a number of faint stars in the field, of which two, Nos. 14 and 17 of his list, were close to my published place. The observations had been made with the 40-inch refractor during 1910 November and December.

I then measured all the faint stars on my early plates and compared them with Professor Barnard's diagram. It was evident that his star 14 was my variable. Its magnitude on 1910 November 24 was estimated by him at  $16^{\text{m}}.7$ .

I have recently received several further letters from Professor Barnard, who has been so kind as to make observations immediately the region became visible again in the morning. On 1911 March 20 he writes: "I got your 'Nova' this morning; it is bright, and is doubtless only a variable. It is slightly yellowish: estimated magnitude 11. It must therefore go through at least five magnitudes. I made it 0.4 brighter than 22 [which had been assumed =  $12^{\text{m}}$ ]. I tried it for focus, and found that its out of focus image showed nothing peculiar." Again, on 1911 March 27, he writes: "This morning it was seen in a dense misty sky, 0.1 brighter than 22."

During the last fortnight the mornings have been persistently cloudy, and I have been unable to observe the star at Cambridge. Judging from Professor Barnard's last observation, it seems possible that the star is already diminishing again.

My measures of the faint stars about the variable were made on the two exposures of plate 896 (1909 August 7). Using the

four Lund stars mentioned above, I have reduced these stars to standard for 1900.0; the resulting coordinates with respect to the centre

$$\alpha \ 19^h 48^m 28^s.00 \quad \delta + 37^\circ 6' 0''.0 \quad (1900.0)$$

are as follows, in minutes of arc :—

Barnard's No. and Mag.		$\xi$ .	$\eta$ .
1	13.0	+14.803	-18.467
4	12.8	+16.120	-19.302
5	13.5	+16.361	-17.043
8 <sub>1</sub>	14	+16.744	-18.389
13	13.5	+17.362	-16.326
22	12	+18.741	-18.576
25	13.3	+19.965	-19.984
26	13	+20.574	-18.986
. . . .		. . .	. . .
14 = Var.		+17.421	-19.011

From these figures we have

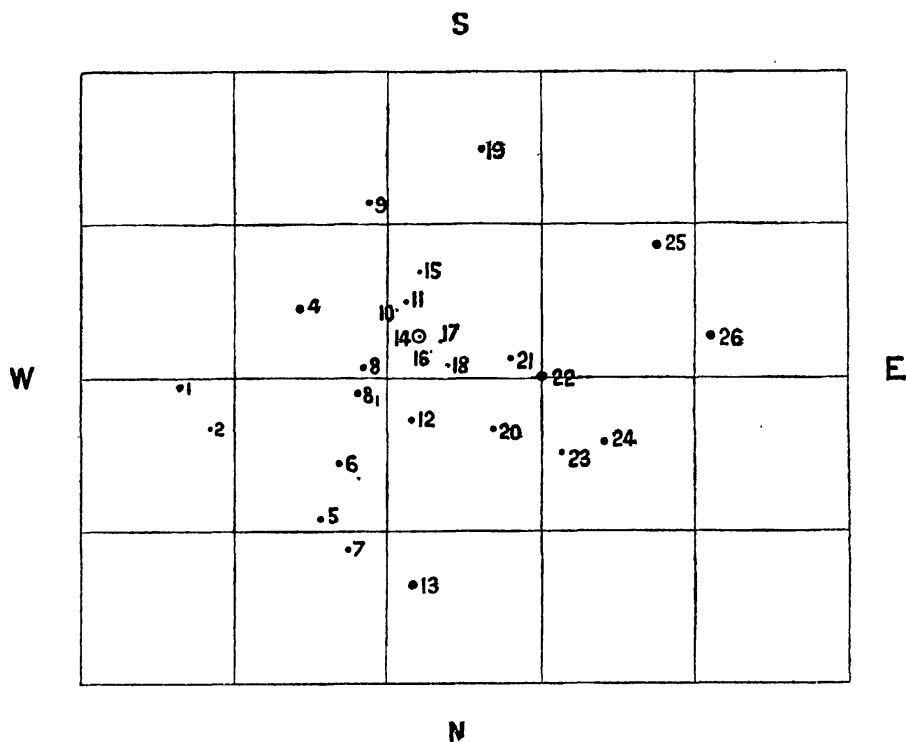
$$1909 \text{ Aug. } *22 - \text{Var.} \quad \Delta\xi + 1'.320 \quad \Delta\eta + 0'.435$$

From the measures which Professor Barnard has kindly sent me, I find approximately (without taking account of small corrections)

$$\begin{array}{lll} 1910 \text{ Nov. } *22 - \text{Var.} & \Delta\xi + 1'.343 & \Delta\eta + 0'.449 \\ 1911 \text{ Mar. } \dots & + 1'.327 & + 0'.427 \end{array}$$

There can be no doubt of the identity of the faint and difficult object of magnitude 16.7 measured by Professor Barnard in November last with the brighter star seen by him later, and photographed by me in 1909 August.

The accompanying diagram shows the stars measured as above on my photograph, together with the fainter stars measured with the micrometer on the 40-inch by Professor Barnard. The magnitudes are Barnard's.



Field of variable 97. 1910. Scale 1 square = 100".

Brighter stars from photographic measures above; fainter stars from micrometric measures communicated by Professor Barnard.

Magnitudes from estimates by Barnard:

1	13.0	11	14.5	21	14
2	15	12	14.2	22	12
4	12.8	13	13.5	23	14
5	13.5	14	var.	24	13.5
6	13.8	15	14.5	25	13.3
7	14	16	v. faint	26	13
8 <sub>1</sub>	14	17	15		
8	14.5	18	v. faint		
9	13.5	19	13.7		
10	v. faint	20	14		

The star 22 is  $\alpha^{in} 42^s$  following and  $68''$  south of the  $8^{m.9}$  star B.D. +  $36^\circ 3750 =$  Lund A.G. 8805.

I must express my sincere thanks to Professor Barnard for the interest and care which he has given to the star, and his kind permission to make use of the information which he has communicated in several letters.

*Cambridge Observatory:*  
1911 April 11.

*The Long-Period Variable U Persei (Ch. 678) in 1909-11.*

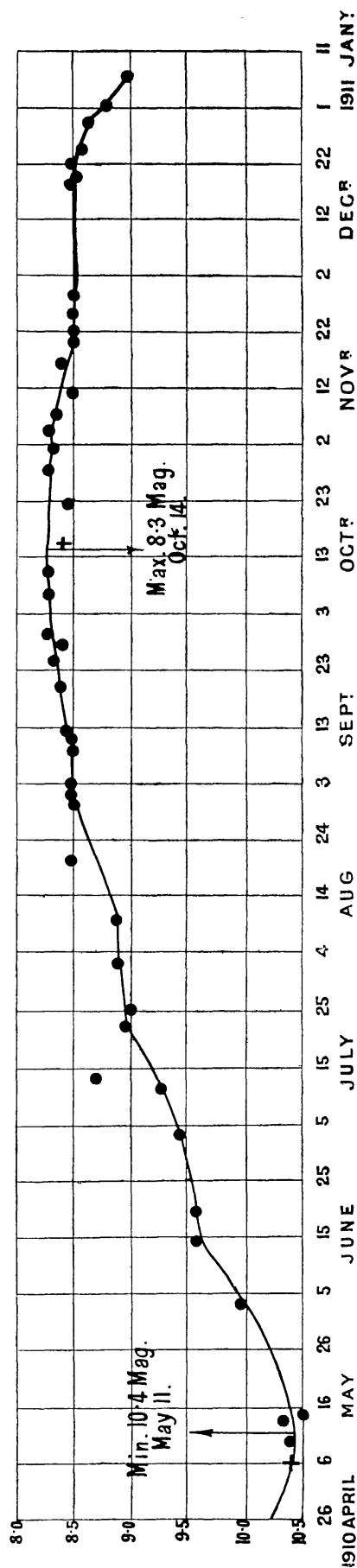
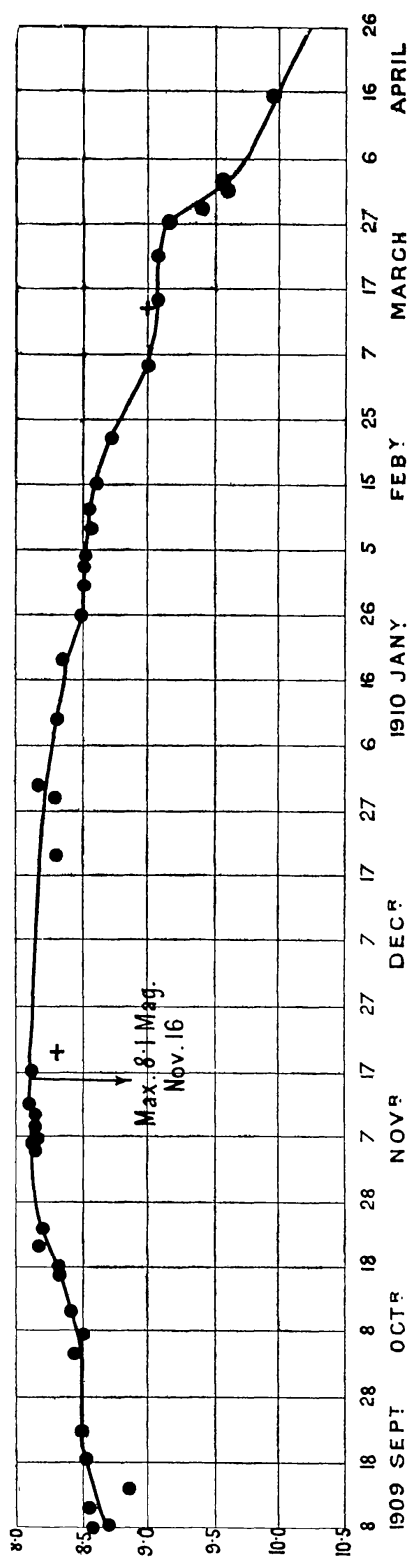
By A. N. Brown, M.A. (Plate 13.)

The eighty-nine observations of U Persei printed below have been arranged upon precisely the same plan as that followed in the case of my observations of RT Cygni published in *Monthly Notices*, lxxi. pp. 486-489. Every remark made respecting the latter as regards the contents of each column, the abbreviations employed, and the method of recording the comparisons applies here also, except that in these observations Hagen's magnitudes have been adopted throughout. These have been obtained from the Catalogue in Series III. of his *Atlas Stell. Var.*

Both the maxima shown on the curve (plate 13) are so much protracted that it is impossible to describe either as having occurred on any particular day. The dates given are approximately those when the middle of the maximum phase in each case occurred. It was far more easy to assign a definite day for the minimum.

*The Observations.*

Date.	Julian date.	Instr.	Class.	Comparisons.	Ded. mag.
1909.					
Sept. 8	8558	t. 30	I	4-3.5, 7+0.5	8.6
9	8559	"	"	6-1.5, 8+0.5; 7-1.5	8.7
11	8561	"	"	4-3.5, 7+1	8.5
14	8564	t. 60	"	7-3, 11+2; 8-1	8.9
19	8569	T. 50	"	4-3, 7+1	8.5
23	8573	t. 30	"	4-2.5, 7+1	8.5
Oct. 5	8585	"	"	4-2, 7+1.5	8.4
8	8588	t. 60	"	4-3, 7+1	8.5
11	8591	t. 30	"	4-2, 7+1.5	8.4
17	8597	"	"	4-1, 7+2.5	8.3
18	8598	"	"	4-1, 7+2.5	8.3
21	8601	"	"	3-1.5, 4+0.5	8.2
24	8604	"	"	3-2, 7+4	8.2
Nov. 5	8616	"	"	3-1, 4+0.5	8.1
6	8617	"	"	3-1, 4+1	8.1
7	8618	"	"	4+0.5	8.2
8	8619	"	"	3-1, 4+0.5	8.1
10	8621	"	"	3-1, 4+0.5	8.1
12	8623	"	"	3-0.5, 4+1	8.1
17	8628	"	"	3-1, 4+1	8.1
20	8631	T. 50	2	4-1	8.3
Dec. 20	8661	T. 25	I	4-0.5, 5+1; 4-1, 7+3	8.3



LIGHT CURVE OF U PERSEI, 1909-11.—A. N. BROWN.